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Knee pain and swelling: An atypical presentation of metastatic colon cancer to the patella

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Knee pain is a common reason for a patient to seek medical evaluation. Of the many causes of knee pain, malignancy is one of the least common. When malignancy is the etiology of the pain, it is usually due to a primary tumor of the osseous structures or soft tissues of the knee joint. Metastatic disease involving the knee joint is uncommon, with few cases reported in the literature. Of these reported cases, metastatic colon cancer is exceedingly rare. However, in a patient with new onset knee pain and the proper clinical history, metastatic disease should be considered as a potential explanation of symptoms. We report a case of knee pain and swelling due to metastatic colon cancer to the patella.

Case report

A 51-year-old male presented with intermittent dull pain and swelling in the patellar region of his right knee for the past 3-4 weeks. He denied injury, fever, or change in his activity level. Vital signs were normal, and the physical examination was significant only for mildly decreased range of motion. Laboratory analysis was unrevealing. The patient's past medical history included hypertension and colon cancer that was treated with surgery and chemotherapy. An aspiration of the right knee joint revealed a small volume of clear yellow fluid and provided brief symptomatic relief. After one week, the swelling returned and the patient had progressive difficulty extending and flexing his knee. The patient was then referred for a magnetic resonance imaging (MRI) examination. This revealed a large, lobulated mass centered within the patella but extending into the joint space (Fig. 1).

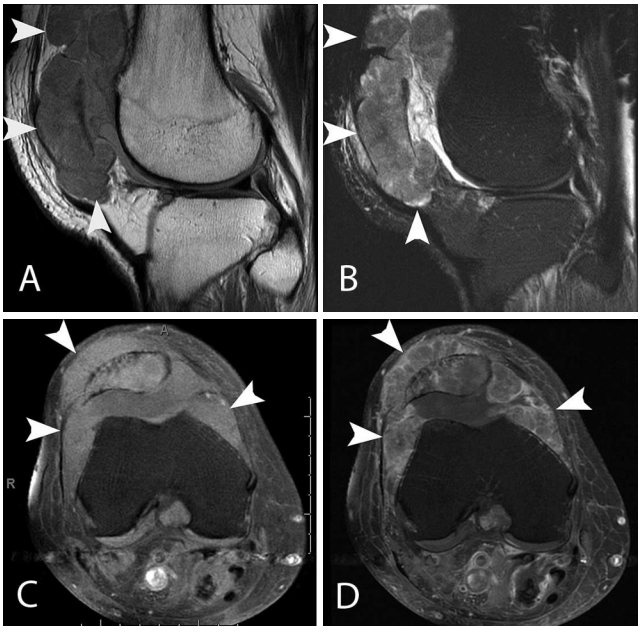

Figure 1. MRI of the knee shows extensive tumor (arrowheads) in the soft tissues along the ventral aspect of the distal femur, within the joint space, and involving the patella. The tumor showed heterogeneous enhancement following contrast administration. **A**. Sagittal T1-weighted MR of the knee. **B**. Sagittal T2-weighted, fat-saturated MR of the knee. **C**. Axial T1-weighted, fat-saturated MR of the knee. **D**. Axial T1-weighted, fat-saturated MR of the knee after administration of intravenous contrast material.

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Figure 2. Resection specimen. The specimen consists of complete resection of the knee joint (distal femur, proximal tibia, patella). Extensive tumor in the soft tissues resulted in formation of intestinal-like glands.

Needle biopsy revealed metastatic adenocarcinoma (Figs. 2 and 3).

The patient underwent resection of the distal right femur, proximal tibia, and knee joint followed by reconstruction with distal femoral replacement and hinge knee arthroplasty. During resection, it was noted that the patella was found to be completely destroyed by tumor, and there was spread of the tumor to the retinaculum of the knee joint. The patient's recovery was uneventful.

Discussion

Knee pain is a common ailment affecting the general population. Primary-care, emergency, and sports-medicine physicians are faced with deciphering the myriad causes of knee pain and swelling. Most cases of knee pain are due to altered biomechanics and inflammatory etiologies and can be treated conservatively. In cases of failed conservative management, advanced imaging and reconstructive surgery are often indicated.

Fortunately, malignancy is a rare cause of knee pain; specifically, malignancies involving the patella are uncommon and are usually due to primary bone tumors such as osteosarcoma (1). More commonly, benign neoplasms and tumor-like conditions account for 70-90% of primary patellar lesions (2); examples include chondroblastoma, bone cysts, giant cell tumors, and gout (1, 3). Metastatic disease involving the patella is even less common than primary malignant tumors (4). A plausible explanation for the relative scarcity of patellar metastases stems from the patella's being a sesamoid bone with a poor blood supply and distal location (5). Sporadic cases of patellar metastases from various primary tumors, such as melanoma, lung, renal cell carcinoma, and laryngeal carcinoma, have been reported in the literature; most of these were due to lung cancer (6-9). Metastatic colon cancer affecting the patella is exceedingly rare; in fact, during the 20-year period from 1969 to 1989, there were no reported cases in the literature (10). To our knowledge, there have only been two reported cases of adenocarcinoma of the rectum and two reported cases of adenocarcinoma of the colon that have metastasized to the patella (9, 11).

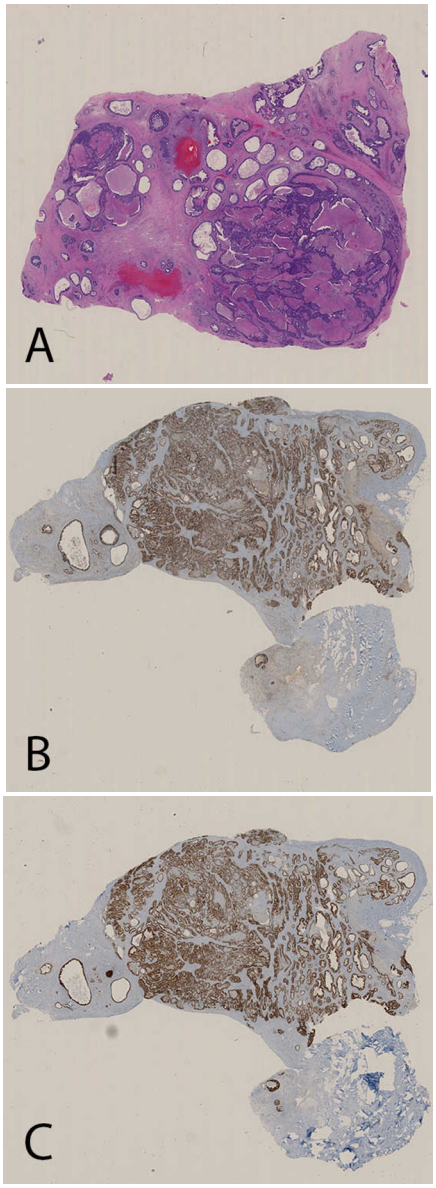

Figure 3. **A**. Low-power hematoxylin and eosin stain of soft-tissue mass arising from the patella demonstrates glands and areas of "dirty" necrosis, characteristic of metastatic gastrointestinal adenocarcinoma. **B**. Low-power keratin stain is positive for epithelial material, consistent with adenocarcinoma. **C**. Low-power CDX2 stain

Radiographic features that raise concern for malignancy involving the patella include osteolytic or osteoblastic permeation or destruction of the cortex, periosteal reaction,

and soft-tissue mass. CT and MRI are often useful for further characterization and facilitate assessment of the soft tissues. Identification of a soft-tissue component in the muscle or joint space is highly suggestive of malignancy, especially in the setting of heterogeneous enhancement of the mass. While there are no specific imaging features that are pathognomonic for a metastatic lesion involving the patella, this differential consideration should be entertained in a patient with the proper history who presents new-onset knee pain.

References

1. Kransdorf MJ, Moser RP, Jr., Vinh TN, Aoki J, Callaghan JJ. Primary tumors of the patella. A review of 42 cases. *Skeletal Radiol.* 1989 18:365-71. [PubMed]
2. Singh J, James SL, Kroon HM, Woertler K, Anderson SE, Jundt G, Davies AM. Tumour and tumour-like lesions of the patella--a multicentre experience. *Eur Radiol.* 2009 Mar;19:701-12. [PubMed]
3. Mercuri M, Casadei R, Ferraro A, de Cristofaro R, Balladelli A, Picci P. Tumours of the patella. *Int Orthop.* 1991 15:115-20. [PubMed]
4. Ehara S, Khurana JS, Kattapuram SV, Rosenberg AE, el-Khoury GY, Rosenthal DI. Osteolytic lesions of the patella. *AJR Am J Roentgenol.* 1989 Jul;153:103-6. [PubMed]
5. Benedek TG. Lysis of the patella due to metastatic carcinoma. *Arthritis Rheum.* 1965 Aug;8:560-7. [PubMed]
6. Meddeb N, Hamza S, Moalla M, Siala M, Sellami S. [Patelar metastasis of primary lung cancer]. *Rev Pneumol Clin.* 2003 Jun;59:176-8. [PubMed]
7. Jaeger HJ, Kruegener GH, Donovan AG. Patellar metastasis from a malignant melanoma. *Int Orthop.* 1992 16:282-4. [PubMed]
8. Choi YS, Yoon YK, Kwak HY, Song IS. Patellar metastasis from a squamous cell carcinoma of the larynx. *AJR Am J Roentgenol.* 2000 Jun;174:1794-5. [PubMed]
9. Saglik Y, Yildiz Y, Basarir K, Tezen E, Guner D. Tumours and tumour-like lesions of the patella: a report of eight cases. *Acta Orthop Belg.* 2008 Jun;74:391-6. [PubMed]
10. Urvoy P, Mestdagh H, Butin E, Lecomte-Houcke M, Maynou C. Patellar metastasis from a large bowel adenocarcinoma. *Acta Orthop Belg.* 1993 59:409-11. [PubMed]
11. Griener B, Muller-Farber J. [Patellar metastasis of colon carcinoma. A rarity in differential diagnosis of acute knee pain. Case report]. *Unfallchirurg.* 2001 Aug;104:778-81. [PubMed]